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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,810	03/31/2004	Randall W. Davis	10143	5294
27015	7590	07/17/2006	EXAMINER	
CHARLES LOUIS THOEMING 1390 WILLOW PASS ROAD, SUITE 1020 CONCORD, CA 94520			CROW, ROBERT THOMAS	
			ART UNIT	PAPER NUMBER
			1634	

DATE MAILED: 07/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/814,810	<b>Applicant(s)</b> DAVIS, RANDALL W.	
	<b>Examiner</b> Robert T. Crow	<b>Art Unit</b> 1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 16 and 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Applicant's election with traverse of Group I in the reply filed on 25 May 2006 is acknowledged. The traversal is on the ground(s) that the search would not be burdensome. This is not found persuasive because a search of Group I would involve searching scrubbing, bead composition, magnets, coating materials, and solutions. In contrast, a search of Group II would involve searching denaturation, application of probe spots, baseline electrical measurements, and linking means. The searches of Groups I and II are clearly not coextensive and would thereby impose a serious burden on the office.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 16-17 are withdrawn. Claims 1-15 are currently under prosecution.

### *Specification*

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested:

Bead-Based Apparatus for Substrate Cleaning.

*Claim Objections*

The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claim "c" been re-numbered 3.

*Claim Rejections - 35 USC § 112*

The following is a quotation of the sixth paragraph of 35 U.S.C. 112:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

1. The limitations "means to scrub clean the planar substrate top side" in line 3 of independent claim 1 and "means to scrub clean the planar semiconductor substrate top side" in lines 12-13 of independent claim 7 are being treated under 35 USC 112, sixth paragraph as being limited to "beads to scrape or clean a surface" as recited in line 17 of page 7 of the Specification.

2. The remaining limitations to "means" as found in claims 2, 4, 8, and 10 are not being treated under 35 USC 112, sixth paragraph because the Specification does not provide explicit limitations as to the means for providing the various functions found in the claims.

*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Molnar (U.S. Patent No. 6,435,948 B1, issued 20 August 2002).

Regarding claim 1, Molnar teaches an improved apparatus for substrate cleansing comprising:

a planar substrate having a top side (e.g., a planar semiconductor wafer [column 8, lines 30-31]; wherein one side is the top side); and

means to scrub clean the planar substrate top side (e.g., an abrasive finishing surface [column 9, lines 10-11] comprising abrasive particles [i.e., beads]; column 9, lines 11-12).

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Regarding claim 2, Molnar teaches the apparatus of claim 1, wherein means to scrub clean the planar substrate top side further comprises:

at least one bead of predetermined diameter moving on and striking the substrate top side (e.g., the abrasive finishing surface comprises abrasive particles [i.e., beads; column 9, lines 11-12] with average diameters of less than 0.5 micrometers; column 34, lines 5-6); and

means for movement of each bead onto the substrate top side (e.g., a magnetically responsive finishing element; column 9, lines 34-35).

Regarding claim 3, Molnar teaches the apparatus of claim 2, wherein the beads are composed of resin (e.g., synthetic resin comprising silica; column 33, lines 60-65).

Regarding claim 4, Molnar teaches the apparatus of claim 2, wherein means for movement of each bead on the substrate top side further comprises means for suspending beads in a solution (e.g., a polishing slurry [column 51, lines 55-60] comprising particles; column 52, lines 2-7).

Regarding claim 5, Molnar teaches the apparatus of claim 4, wherein the solution is aqueous (column 51, lines 55-60).

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 2, 4, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molnar (U.S. Patent No. 6,435,948 B1, issued 20 August 2002) in view of You et al (U.S. Patent No. 6,317,642, issued 13 November 2001).

Regarding claim 6, Molnar teaches an improved apparatus of claim 1 for substrate cleansing comprising:

a planar substrate having a top side (e.g., a planar semiconductor wafer [column 8, lines 30-31]; wherein one side is the top side); and

means to scrub clean the planar substrate top side (e.g., an abrasive finishing surface [column 9, lines 10-11] comprising abrasive particles [i.e., beads]; column 9, lines 11-12).

Molnar also teaches the apparatus of claim 2, wherein means to scrub clean the planar substrate top side further comprises:

at least one bead of predetermined diameter moving on and striking the substrate top side (e.g., the abrasive finishing surface comprises abrasive particles [i.e.,

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beads; column 9, lines 11-12] with average diameters of less than 0.5 micrometers; column 34, lines 5-6);

means for movement of each bead onto the substrate top side (e.g., a magnetically responsive finishing element; column 9, lines 34-35).

Molnar also teaches the apparatus of claim 4, wherein means for movement of each bead on the substrate top side further comprises means for suspending beads in a solution (e.g., a polishing slurry [column 51, lines 55-60] comprising particles; column 52, lines 2-7).

Molnar is silent with respect to a closed vessel.

However, You et al teach an apparatus for dispensing solutions on semiconductor wafers (Abstract) comprising a sealed chamber (i.e., a closed vessel) with the added advantage that use of the sealed deposition chamber increases the planarity of the wafer (column 16, lines 40-50).

It would therefore have been obvious to a person of ordinary skill in the art at the time the invention was claimed to have modified the apparatus as taught by Molnar with the closed vessel as taught by You et al with a reasonable expectation of success. The ordinary artisan would have been motivated to make such a modification because said modification would have resulted in increased planarity of the wafer as taught by You et al (column 16, lines 40-50).

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2. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heller et al (U.S. Patent No. 5,632,957, issued 27 May 1997) in view of Molnar (U.S. Patent No. 6,435,948 B1, issued 20 August 2002).

Regarding claim 7, Heller et al teach an apparatus for isolation of unreacted bioreactive material comprising:

a planar semiconductor substrate having top side (e.g., a semiconductor support having an active programmable matrix system of individually addressable electrodes on top; column 14, lines 32-55 and Figure 8);

a plurality of sense sites formed within the substrate top side further defining a matrix of sense sites, wherein each sense site comprises a well to receive probe molecules (e.g., wells are formed atop of the electrode layer of the patterned matrix system; column 6, line 54-column 7, line 2);

means to mechanically apply or synthetically construct a probe spot sample to a region of sense sites (e.g., an automated system that automatically selects DNA and restricts the DNA into fragments [i.e., the probe spot sample], followed by electrophoretic transport to the APEX chip [i.e., the active programmable matrix system]; column 10, line 27- column 11, line 7);

means to separate the probe spot sample into multiple, separate sense site wells (e.g., the electrodes, which are individually activated to transport binding entities [i.e., DNA] to specific microlocations; column 8, lines 20-40).

Heller et al are silent with respect to scrubbing the top side of the semiconductor substrate.

However, Molnar teaches an improved apparatus for substrate cleansing comprising: a planar semiconductor substrate having a top side (e.g., a planar semiconductor wafer [column 8, lines 30-31]; wherein one side is the top side) and means to scrub clean the planar substrate top side (e.g., an abrasive finishing surface [column 9, lines 10-11] comprising abrasive particles [i.e., beads]; column 9, lines 11-12) with the added advantage that the apparatus improves the yield and lowers the cost of manufacture of semiconductor wafers (Abstract).

It would therefore have been obvious to a person of ordinary skill in the art at the time the invention was claimed to have modified the apparatus as taught by Heller et al with the semiconductor scrubbing as taught by Molnar with a reasonable expectation of success. The ordinary artisan would have been motivated to make such a modification because said modification would have resulted in improvements in the yield and lowering of the cost of manufacture of semiconductor wafers as explicitly taught by Molnar (Abstract).

In addition, the courts have held that “while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function.” *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). In addition, “[A]pparatus claims cover what a device *is*, not what a device *does*.” *Hewlett-Packard Co.*

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*v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990)

(emphasis in original). Therefore, the various uses recited in claim 7 (e.g., isolation of unreacted bioreactive material) fail to define additional structural elements to the device of claim 7. Because Heller et al in view of Molnar teach the structural elements of claim 7, claim 7 is obvious over Heller et al in view of Molnar. See MPEP § 2114.

3. Claims 8-10 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heller et al (U.S. Patent No. 5,632,957, issued 27 May 1997) and Molnar (U.S. Patent No. 6,435,948 B1, issued 20 August 2002) as applied to claim 7 above, and further in view of Daniel et al (U.S. Patent No. 6,121,147, issued 19 September 2000).

Regarding claim 8, the apparatus of claim 7 is discussed above. Molnar also teaches means for movement or contact of each bead on the substrate top side (e.g., a magnetically responsive finishing element; column 9, lines 34-35). While Molnar also teaches the cleaning of the substrate with beads (i.e., abrasive particles in a slurry; column 9, lines 11-24) having predetermined diameters (e.g., having average diameters of less than 0.5 micrometers; column 34, lines 5-6); Heller et al and Molnar are silent with respect to beads not entering into the sense site wells.

However, Daniel et al teach an apparatus for scrubbing semiconductor top sides (e.g., an apparatus for polishing a semiconductor wafer down to a metallic reporting substance of the wafer; Abstract, last two lines) wherein the substrate top side is cleaned (i.e., polished) with an abrasive slurry (column 5, lines 41-50) such that the wells (i.e.,

trenches 22 of Figure 1C that are filled with layer 24 of Figure 1D) are not contacted with the abrasive material (i.e., the substrate tops side [i.e., layer 24] is polished to an endpoint so that filled wells [i.e., trenches] are planarized with the rest of the substrate [Figure 1E and column 3, line 49-column 4, line 21]; therefore, none of the abrasive slurry has entered the wells) with the added advantage that endpoint polishing prevents scrapping of the semiconductor, thereby minimizing the cost of production (column 1, lines 46-60).

It would therefore have been obvious to modify the apparatus comprising abrasive particles in a slurry as taught by Heller et al and Molnar so that the slurry does not enter or drop down into the wells as taught by Daniel et al with a reasonable expectation of success. The ordinary artisan would have been motivated to make such a modification because said modification would have resulted in prevention of the scrapping of the semiconductor, thereby minimizing the cost of production as explicitly taught by Daniel et al (column 1, lines 46-60).

Regarding claim 9, the apparatus of claim 8 is discussed above. Molnar also teaches the beads are composed of resin (e.g., synthetic resin comprising silica; column 33, lines 60-65).

Regarding claim 10, the apparatus of claim 9 is discussed above. Molnar also teaches means for movement of each bead on the substrate top side further comprises

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means for suspending beads in a solution (e.g., a polishing slurry [column 51, lines 55-60] comprising particles; column 52, lines 2-7).

Regarding claim 13, the apparatus of claim 10 is discussed above. Molnar also teaches bead diameters of less than 5 microns (column 34, lines 5-6)

Regarding claim 14, the apparatus of claim 10 is discussed above. Molnar also teaches the solution is aqueous (column 51, lines 55-60).

4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heller et al (U.S. Patent No. 5,632,957, issued 27 May 1997), Molnar (U.S. Patent No. 6,435,948 B1, issued 20 August 2002) and Daniel et al (U.S. Patent No. 6,121,147, issued 19 September 2000) as applied to claim 10 above, and further in view of Takada et al (U.S. Patent No. 5,855,735, issued 5 January 1997).

Regarding claim 11, the apparatus of claim 10 is discussed above. Neither Heller et al, Molnar, nor Daniel et al teach bead diameters from 5 microns to greater than 1000 microns.

However, Takada et al teach abrasive particles in a slurry for cleaning substrates having particle diameters from 6 microns or larger with the added advantage that the particles so not leave a residue from hard films (column 7, lines 26-30).

It would therefore have been obvious to modify the apparatus comprising abrasive particles in a slurry as taught by Heller et al, Molnar, and Daniel et al with the particle diameters as taught by Takada et al with a reasonable expectation of success. The ordinary artisan would have been motivated to make such a modification because said modification would have resulted in particles that do not leave a residue from hard films as explicitly taught by Takada et al (column 7, lines 26-30).

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heller et al (U.S. Patent No. 5,632,957, issued 27 May 1997), Molnar (U.S. Patent No. 6,435,948 B1, issued 20 August 2002) and Daniel et al (U.S. Patent No. 6,121,147, issued 19 September 2000) as applied to claim 10 above, and further in view of Lajoie et al (U.S. Patent No. 5,112,406, issued 12 May 1992).

Regarding claim 12, the apparatus of claim 10 is discussed above. Neither Heller et al, Molnar, nor Daniel et al teach bead diameters from 5 microns to greater than 1000 microns.

However, Lajoie et al teach abrasive sodium sulfate particles (i.e., particles for removing coatings) having diameters of 1000 microns (column 2, lines 27-30) with the added advantage that the particles are inexpensive (column 2, lines 8-10).

It would therefore have been obvious to modify the apparatus comprising abrasive particles in a slurry as taught by Heller et al, Molnar, and Daniel et al with the

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particle diameters as taught by Lajoie et al with a reasonable expectation of success.

The ordinary artisan would have been motivated to make such a modification because said modification would have resulted in inexpensive particles as explicitly taught by Lajoie et al (column 2, lines 8-10).

It is noted that the courts have stated where the claimed ranges "overlap or lie inside the ranged disclosed by the prior art" and even when the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have similar properties, a *prima facie* case of obviousness exists (see *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990); *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (see MPEP 2144.05.01). Therefore, the claimed range of greater than 1000 microns is obvious over the 1000 microns taught by Lajoie et al.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heller et al (U.S. Patent No. 5,632,957, issued 27 May 1997), Molnar (U.S. Patent No. 6,435,948 B1, issued 20 August 2002) and Daniel et al (U.S. Patent No. 6,121,147, issued 19 September 2000) as applied to claim 14 above, and further in view You et al (U.S. Patent No. 6,317,642, issued 13 November 2001).

Regarding claim 15, the apparatus of claim 14 is discussed above. Neither Heller et al, Molnar, nor Daniel et al teach closed vessels.

However, You et al teach an apparatus for dispensing solutions on semiconductor wafers (Abstract) comprising a sealed chamber (i.e., a closed vessel) with the added advantage that use of the sealed deposition chamber increases the planarity of the wafer (column 16, lines 40-50).

It would therefore have been obvious to a person of ordinary skill in the art at the time the invention was claimed to have modified the apparatus as taught by Heller et al, Molnar, and Daniel et al with the closed vessel as taught by You et al with a reasonable expectation of success. The ordinary artisan would have been motivated to make such a modification because said modification would have resulted in increased planarity of the wafer as taught by You et al (column 16, lines 40-50).

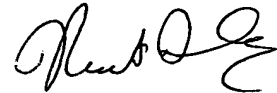
### *Conclusion*

1. No claim is allowed.
2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert T. Crow whose telephone number is (571) 272-1113. The examiner can normally be reached on Monday through Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Robert T. Crow  
Examiner  
Art Unit 1634



**JULIET C. SWITZER**  
**PRIMARY EXAMINER**